

NHA	USED ON	MOD	LTR	DESCRIPTION	DATE	APPROVED
			-	Initial Release	3/14/90	<i>DW</i>
			A	Added Part II	3/19/90	<i>DW</i>
			B	Revised pgs 4, Fig. 1 loads	3/20/90	<i>DW</i>

REPORT NO. E90-216

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONS DECIMALS ANGLES $\pm 1/32$ $\pm .02$ $\pm .003 \pm 1^\circ$	DRN	SFENA - CORPORATION			
	CHK <i>DW</i>	3/14/90	GRAND PRAIRIE - TEXAS		
	APP <i>B. Dillion</i>	3/20/90	STATIC TEST OF THE SX-16 NIGHTSUN INSTALLED ON BHTI MODEL 412 HELICOPTER		
	CONTRACT :				
	SFENA APP	SIZE A	CODE IDENT NO. 58356	DWG NO. E90-216	
	CUST. APP	SCALE N/A	WT. -	SHEET 1 of 10	

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REPORT NO. E90-216

STATIC TEST OF THE SX-16 NIGHTSUN
INSTALLED ON THE BHTI 412 HELICOPTER
(Ref. Project No. SW-170-489)

PART I: TEST PLAN

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STATIC TEST OF THE SX-16 NIGHTSUN
INSTALLED ON THE BHTI MODEL 412
HELICOPTER

SIZE

A

CODE IDENT NO.

58356

DWG NO.

E90-216

SCALE

N/A

REV. B

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WSS 1: 1221 BTVP

(REF: PROJ) REF NO: 24-10-80
EXCERPTED ON THE BASIS OF THE
STUDY OF THE EX-10 MIGHTON

REF: 1 24-10-80

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INTRODUCTION

This report is written to document a static test of the SX-16 Nightsun, installed on a BHTI model 412, in accordance with SFENA Drawing No. B30-13003. The test is to fulfill part of the requirements toward the issuance of an STC by the FAA. The test will show compliance with FAR 29.561. Additionally, the drag force which occurs on the externally mounted SX-16 will also be considered.

The procedure used to calculate the drag will be the same as previously used in Report No. E89-207 pursuant to an STC (reference Project No. SW-170-482).

The test will be conducted at the SFENA facility at Grand Prairie Municipal Airport. The test will be conducted by the writer. Should the FAA Structures Engineer wish to witness the test, please notify the writer or Dave Neese at SFENA Corporation when approval of the test plan is completed.

→ The results of the static test of the SX-16 Nightsun will be reported as Part II of this report. ←

STATIC TEST OF THE SX-16 NIGHTSUN
INSTALLED ON THE BHTI MODEL 412
HELICOPTER

SIZE

A

CODE IDENT NO.

58356

DWG NO.

E90-216

SCALE

N/A

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B

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TEST LOADS

The test loads to be applied to the SX-16 Nightsun installation are described below. For this test, in order to preclude possible damage to the SX-16, it will be removed from the gimbal. All test loads will be applied through the C.G. of the Nightsun. The weight of the Nightsun and gimbal is 37 lbs. The weight of the mounting provisions is less than 3 lbs, but conservatively, 3 lbs will be used for the test. This weight will also be assumed at the C.G. of the Nightsun.

Drag Load:

$D = \frac{1}{2} (d \times V^2 \times CD \times A)$, where

D is drag in pounds.

d is density of air, 0.00237 slugs/ft³.

V is velocity, 154 Kt or 260 ft/second.

CD is coefficient of drag, 1.12.

A is area projection of Nightsun, 1.833 ft².

The calculation of drag {D} yields a value of 164.5 lbs.

The ultimate load for drag is $1.5 \times 164.5 = 247$ lbs., use 250 lbs. for test.

Because the 4g forward crash value is lower than the drag load, and since the mounting provisions for the Nightsun are basically symmetrical in the fore and aft direction, the drag load will be applied, based upon its value exceeding the inertia load calculated below.

The forward, lateral and downward loads are calculated as follows:

Forward:

4G x 40 lbs = 160 lbs, applied forward.

Lateral:

2G x 40 lbs = 80 lbs, applied to the left or right.

Downward:

4G x 40 lbs = 160 lbs, applied downward.

The installation must withstand the above described loads without any structural failure or permanent deformation.

STATIC TEST OF THE SX-16 NIGHTSUN
INSTALLED ON THE BHTI MODEL 412
HELICOPTER

SIZE

A

CODE IDENT NO.

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E90-216

SCALE

N/A

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REPORT NO. E90-216

STATIC TEST OF THE SX-16 NIGHTSUN
INSTALLED ON THE MODEL BHTI 412 HELICOPTER
(Ref. Project No. SW-170-489)

PART II: RESULTS

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STATIC TEST OF THE SX-16 NIGHTSUN
INSTALLED ON THE BHTI MODEL 412
HELICOPTER

SIZE

A

CODE IDENT NO.

58356

DWG NO.

E90-216

SCALE

N/A

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B

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TEST RESULTS

The test of the SX-16 Nightsun on a Model 412 helicopter in accordance with the SFENA Drawing No. B30-13003 was conducted exactly as proposed in Part I of this report.

In accordance with the test plan, a forward, downward and lateral load was applied assuming the center of gravity of the installation to be located at the gimbal pivot axis on centerline of the light assembly.

Figures 1 through 3 show the SX-16 installation while undergoing testing. There was no excessive deflection or failure of any of the hardware associated with the installation.

STATIC TEST OF THE SX-16 NIGHTSUN
INSTALLED ON THE BHTI MODEL 412
HELICOPTER

SIZE

A

CODE IDENT NO.

58356

DWG NO.

E90-216

SCALE N/A

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CONCLUSION

It is concluded that the SX-16 Nightsun installation tested on a Model 412 helicopter is structurally acceptable based on the successful completion of testing as described in this report. Therefore, the installation meets all structural requirements of FAR Part 29 towards the issuance of an STC.

STATIC TEST OF THE SX-16 NIGHTSUN
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HELICOPTER

SIZE

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FIGURE 1 -- SX-16 NIGHTSUN INSTALLATION DURING THE APPLICATION OF THE 250 LB DRAG LOAD.

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HELICOPTER

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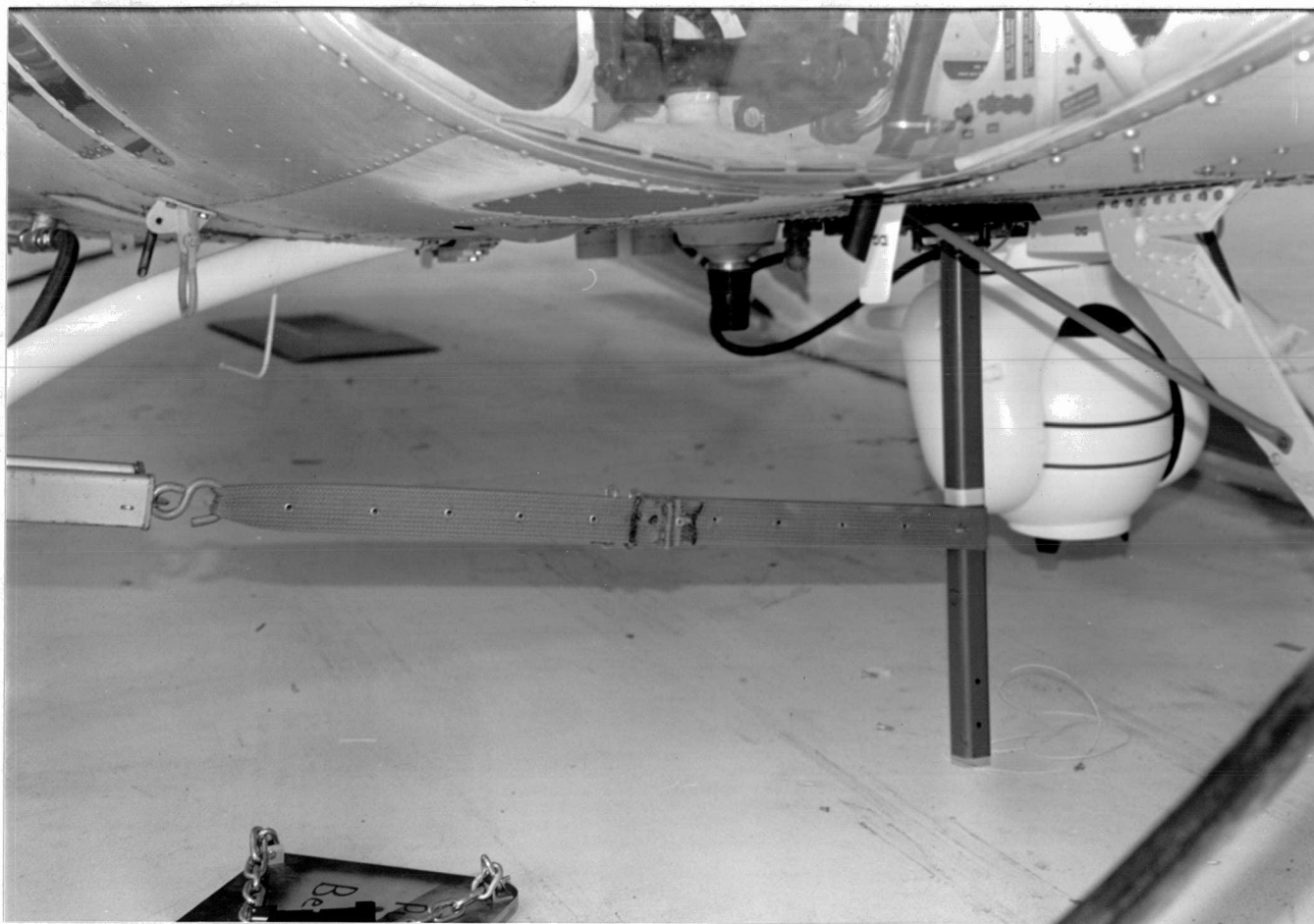


FIGURE 2 -- SX-16 NIGHTSUN INSTALLATION DURING THE APPLICATION OF THE 80 LB LATERAL LOAD

STATIC TEST OF THE SX-16 NIGHTSUN
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HELICOPTER

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FIGURE 3 -- SX-16 NIGHTSUN INSTALLATION DURING THE APPLICATION OF THE 160 LB DOWNWARD LOAD

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